REMARKS

Claims 1-7, 9, and 11-30 are still pending in this application. Claims 8 and 10 have been incorporated into independent claim 5. Claims 8 and 10 have been cancelled. Reconsideration of the application is earnestly requested.

Response to Office Action

The Examiner has maintained the rejection of the claims in view of *Chess* and *Chandnani*. In the recent final office action (page 4) and in the current office action, it is stated that Applicants have failed to explicitly identify specific claim limitations which would define a patentable distinction over prior art. To the contrary, Applicant submits that the Reply mailed June 9, 2005 very specifically identified at least one claim limitation in each of the independent claims that was not present in any of the cited art.

Applicant detailed very carefully why the *Chess* and the *Chandnani* references are not relevant and pointed out which elements of the claims the references do not teach or suggest. For example, the three steps of claim 5 not present in *Chess*. Claim 15 requires extracting, linearizing and determining key actions; *Chess* does not teach or suggest such steps. Claim 1 requires "generating a language independent representation of the portion of the interpreted language source code." *Chandnani* does not teach or suggest generating a language independent representation of interpreted language source code. Claim 11 requires extracting and linearizing key actions and comparing the executing thread; the steps are not taught or suggested by *Chandnani*. Claims 21 and 25 are Beauregard claims that are similar to the above claims. Various of the dependent claims also contain features not present in the cited art as detailed in the previous Reply.

Response to Arguments--*Chess*

In the current Office Action the Examiner presents a Response to Arguments starting at page 3 in which specific sections of the prior art are relied upon as disclosing features of the independent claims.

The current Office Action now cites column 4, line 38 to column 5, line 2 and column 11, lines 39 to 56 of *Chess* as disclosing claims 5, 7-10, 15-20 and 25-30. But, columns 4 and 5 only disclose a comparison of a host computer file and an infected version of the host computer file.

A virus-attachment description and a virus-structure description are prepared, but the required features of the independent claims are not disclosed.

Claim 5

Claim 5 requires "receiving a portion of interpreted language source code containing a computer virus." *Chess* does not teach or suggest an interpreted language that contains a computer virus nor source code that contains a virus. That portion of *Chess* relied upon only discloses host and infected files written in binary code or bytes. There is no discussion of source code or of an interpreted language.

Claim 5 also requires "parsing the portion of interpreted language source code into tokens using a parser." The computer virus code shown in Figure 4 of *Chess* is not interpreted language source code that is parsed into tokens.

Claim 5 also requires "generating a language-independent representation of the computer virus from said portion of the tokens." That portion of *Chess* relied upon does not disclose generating a representation of the computer virus that is independent of the language in which is written. In fact, Figure 4 simply shows manipulation of byte codes, the language in which viruses Sample 1 and Sample 2 are written. A byte code is not independent of the language used.

Claim 5 also requires that "the language independent representation is a linearized string of key actions." The Office Action relies upon column 12 of *Chess* for this feature. But this portion of *Chess* is referring to Figure 4 that simply shows that a computer virus is separated into sections of byte codes, some being variable over samples, some being constant. A byte code is not a "key action" as described in the Specification of the instant application; nor is the string "linearized." As described in the Specification of the instant application, "linearized" refers to rearranging portions of the virus code such that they appear in the order in which they are executed; Figure 4 simply shows that the byte codes of the computer virus are left as is.

Claim 5 also requires "storing the language-independent representation of the computer virus as a virus signature." Because *Chess* does not disclose a language-independent representation, it likewise does not disclose storing that representation as a virus signature. In fact, *Chess* does not concern itself with generating in storing a virus signature for future use. Column 11, lines 55-57 mentions that a signature can be extracted for identification, but there is no teaching that this signature is stored for later use.

Claim 15

Those features of claims 15-20 similar to the above features of claims 5-10 that have already been discussed are likewise not taught or suggested by *Chess* for the above reasons.

Further, claim 15 requires "extracting key actions," "linearizing key actions," "determining the set of minimum key actions," and "storing the set of minimum key actions as a virus signature." Respectfully, it is pointed out that columns 11 and 12 of *Chess* do not involve extracting, linearizing or determining key actions. Again, it is pointed out that Figure 4 of *Chess* simply discloses placing the virus code into sections and determining which sections remain constant over samples and which sections are variable. None of the above-cited steps of claim 15 are taught or suggested in *Chess*.

Response to Arguments--*Chandnani*

The current Office Action now cites paragraphs 16, 20, 29, 51-56 and 64 of *Chandnani* as disclosing claims 1-4, 11-14 and 21-24. But, paragraph 16 only discloses detecting a script language virus using language description data dependent on the script language. Claim 1 requires a language independent representation. Paragraph 20 only discloses that the incoming data stream (the script language) is converted into a stream of tokens; paragraph 29 discloses lexical analysis of a data stream. Claim 11, though, requires further steps as explained below. Paragraphs 51-56 (and paragraph 50) describe creating viral code detection data (a detection regimen) from samples of script language viral code. The detection regimen is converted to binary format and then matched against suspected viral code (such as a corrupt system macro, as shown). But, the independent claims require distinctive features as explained below.

Claims 1-4

Claim 1 is a method for identifying a computer virus in interpreted language source code. After a portion of the code is received, the second step of the claim requires "generating a language independent-representation of the portion of the interpreted language source code." The third and fourth steps also require the "language-independent representation" limitation. Use of a language-independent representation is beneficial because it can better detect polymorphs of scripting language viruses.

By contrast, *Chandnani* does not teach or suggest generating a language-independent representation of the interpreted language source code to be scanned for a virus. *Chandnani* does

show in Figure 2 that an incoming data stream representing script code is fed into a detection engine 53 that has a lexical analyzer. (Paragraphs 57-62.) The lexical analyzer converts the data stream into a stream of tokens but no other processing is performed on the tokens. A stream of tokens is not a language independent representation of the source code. A stream of tokens is very much a language dependent stream of characters, language constructs, symbols, etc., that represent a particular scripting language.

Because the second step of claim 1 is not taught or suggested, it is requested that the rejection be withdrawn.

Claim 3 requires that "the virus signature is a language independent representation of an interpreted language source code computer virus." The data stream of tokens in *Chandnani* is compared to the virus detection data from database 57. But the virus detection data is not a language independent representation of source code. The virus detection data is a pattern of tokens or a CRC signature check (Paragraph 51), neither of which is a language independent representation. Further, because the virus detection data is compared directly to the stream of tokens (the tokens representing the particular script language used), the virus detection data must also be in the form of the particular script language being used (Paragraph 64). If the virus detection data were in a *language independent* form it would not be possible to match the stream of tokens which are in a *language dependent* form. The Office Action cites paragraph 55 as disclosing that the virus signature is in a language independent representation, but paragraph 55 only discloses that DFA data is used to transition from one stage in a pattern match operation to the next. The actual pattern match data (i.e., the virus signature) is still in a language dependent form.

Claim 4 requires that both the source code and the virus signature "are presented as a linearized string of key actions." As discussed above, *Chandnani* does not disclose key actions nor a linearized string.

Claims 11-14

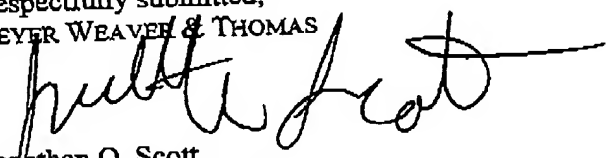
Claim 11 requires "extracting selected key actions from the tokenized source code," "linearizing the key actions to generate and executing thread," and "comparing the executing thread with a virus signature of a known virus." As pointed out above in the overview of *Chandnani*, once the incoming data stream is converted into a stream of tokens there is no other processing performed upon the tokens and no further representation of the tokens is produced.

Paragraphs 57-64 only disclose that the incoming data stream is converted into a stream of tokens by a lexical analyzer; no further conversion or processing is performed. Thus, the required steps of "extracting selected key actions," "linearizing the key actions," and "comparing the executing thread" are not taught or suggested by *Chandnani*. The Office Action relies upon paragraph 20, but paragraph 20 only discloses that the incoming data stream (the script language) is converted into a stream of tokens. The Office Action also cites paragraph 64 but this paragraph only discloses that a pattern is matched against the token stream; there is no "executing thread" because *Chandnani* does not linearize any key actions let alone the generate key actions from the tokens in the first place.

Therefore, Applicant submits that the claims are allowable and requests that the rejections be withdrawn.

Reconsideration of this application and issuance of a Notice of Allowance at an early date are respectfully requested. If the Examiner believes a telephone conference would in any way expedite prosecution, please do not hesitate to telephone the undersigned at (612) 252-3330.

Respectfully submitted,
BEYER WEAVER & THOMAS



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